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System Analysis Design

Chapter 6

Feasibility Analysis

Learning Goals

- How to formulate the goals to be met by the information system to be designed.
- How to quantify the goals.
- How to obtain alternative solutions to satisfy the goals.
- How to assess the feasibility of implementing alternative solutions.
- How to compute cost vs benefits of each alternative feasible solution.
- How to prepare a system proposal for the potential users of the system.

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Feasibility Analysis

- Feasibility analysis is the process of determining whether a business idea is workable.
- It is the preliminary evaluation of a business idea, conducted for the purpose of determining whether the idea is worth pursuing.

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Feasibility Analysis

- The following are the results of the Information gathering phase:
  - Deficiency/Lack of the current system are found
  - Agreement is arrived at on requirements
  - SRS (Software Requirement Specification) Document is prepared

Steps in Feasibility Analysis

- Note down deficiencies in current system found while preparing SRS Document.
- Set goals to remove deficiencies
- Quantify/Calculate Goals
- Find alternative solutions to meet goals
- Evaluate feasibility of alternative solutions taking into account constraints on resources.
- Rank order alternatives and discuss with user.
- Prepare a system proposal for management approval

Goal and Sub-Goal

- Define the goals and sub-goals of the proposed system
- Quantify/Measure the goals and sub-goals from the verbal statement of goal
- For example: Send bill soon after month end
- Quantified statement of the same goal:
  - **Send bill within 5 days of month end**
  - **Find out whether it is possible to meet these goals.**
  - **Determine the cost of meeting each goal**
  - **Find cost benefit if quantified**

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Guidelines for Searching Goals

- Identify the deficiency by pinpointing
  - -Missing Functions
  - -Unsatisfactory performance
  - -Excessive cost of operations
- Set Goals to remove deficiency and provide competitive advantage

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Characteristics of a Goal

- Must be quantified
- Realizable/Reachable with the constraints of the organization and the system
- Broken down into Sub-Goals
- Agreeable to all concerned
- In general goals must not only remove deficiency but also give a system which is superior to those of the competitors of the organization

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Case study: Hostel Information System

(Detailed description of case is given)

- **Deficiencies of current System Identified**

Missing Functions

1.1 : Stores requirement not forecast

1.2 : Purchases not combined

1.3 : Daily rate calculation not frequently updated

1.4 : Menu not planned for balanced nutrition and low cost

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Deficiencies (bad performance)

- **Unsatisfactory Performance**

  2.1 : Billing not accurate and rapid

  2.2 : Student bills not recorded

  2.3 : Stores issue to cooks subjective

  2.4 : Payments to vendors not speedy

  2.5 : Large variations in mess bills every month

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Deficiencies (High operational cost)

3.1 : Unpaid and long outstanding bills from students

3.2 : Extras and discounts not reflected in stores issues

3.3 : Frequent small purchases at high cost

3.4 : High transport cost due to not consolidating stores requirements

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Formulation of Goals

Main Goals:

- **MI :** Send bill to students within 5 days of the end of month
- **M2 :** Control inventory of items in stores & issues to cooks to bring down mess bill by 10%
- **M3:** Balance menu to meet nutritional requirements
- **M4:** Cost of new menu not to exceed current cost

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Formulation of Sub-Goals

- **S1.1** : Itemize bills showing extras and rebates with dates
- **S1.2:** Ensure less than 5% variations of bills from month to month
- **S1.3 :** Bills not paid within 10 days of issue brought to the attention of chief warden
- **S1.4 :** Update daily rates every day

❑ Main goals **M1** and sub-goals **S1.1**,**S1.2**,**S1.3** remove deficiencies **1.3**,**2.1**,**1.2.2**,**2.5**,**3.1**

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Formulation of Sub-Goals

- **S2.1 :** Ensure payment to vendors within five days of supply of items
- **S2.2 :** Maximum 4 trips per month for purchases. Cartage less than 1% of item cost
- **S2.3 :** Reduce inventory level. Level not more than 10% of requirements in a month
- **S2.4 :** Issue to cooks every day not to exceed 5% of calculated values

❑ Main goals M1& sub-goals above remove deficiencies **1.1**, **1.2**, **2.3**, **2.4**,**3.2**,**3.3**,**3.4**

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Examining Alternative Solutions

Hostel Information System

Alternative Solutions:

A: Improve manual system

B: Use PC based periodic update system

C: An on-line system with server and several clients

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Solution A: Manual System

- **Manual System may be improved as follows:**
  - Keep up-to-date running total of extras and rebates for each student
  - Use look up table to find material needed each day based on number of extras
  - Cost each day's issue and keep running total
  - Calculate standard quantities needed and use for vendor order
  - Track student payments to find overdue payments
  - Solution does not ensure reduction in bill variations and prompt payment to vendors
  - Solution not scalable to large student population

Solution : B

- **Use a single PC to**
  - Prepare students bills-itemize bills
  - Prepare number of members who will eat for next two days
  - Alert warden when bill not paid within 10 days of issue
  - Vendor order generation
  - Inventory control of store
  - Menu planning

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Solution: B (Contd..)

- PC configuration needed based on data base sizes PC with 20 MB disk, 1.2 MB floppy sufficient
- However minimum configuration available today(2004) is PC with 128 MB main memory, 40 GB disk 1.2MB floppy & CD R/W costs Rs. 25,000.Systems software(Windows XP+MSOffice+anti-virus) will cost around Rs.25,000.
- Total cost=Rs 50,000
- Need PC+ printer+uninterrupted power supply cost Rs. 70,000

Solution : C

- Use a server which is accessed by 3 clients one each in the mess, the stores and the accounts sections; perform on-line transaction processing.
- Advantage: Up to the minute status can be found
- Number of transactions small and does not justify 4 computers
- Solution unnecessarily expensive and rejected

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Evaluating Alternative Solutions

- Determine **Technical feasibility** of each solution,in other words is technology mature to implement a solution.
- Determine **Operational feasibility** of each solution. In other words,for a given organizational structure will the solution fit in. Will it provide right information at the right time to users
- Determine **Economic feasibility** of each solution. In other words, are finances available to implement system? Will it be cost effective? Will the money spent be recovered by savings or by better services to users?

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Technical and Operational Feasibility

- Solution B is selected for further consideration
- It is technically feasible as PC of necessary configuration is easily available.
- It is also operationally feasible as clerks in hostel office can be easily trained to use a PC. The necessary problems will be written by system analyst/ programmer hired for this purpose.

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Practice Example

‘’Hasan hospital’’ is one of the familiar hospitals that includes a number of departments, rooms, doctors, nurses, compounders, and other staff working in the hospital.

Nowadays hospital management is facing some problems such as indoor patients are not paying their bills on time and there is no forecasting for daily requirements of these indoor patients. On the other hand, outdoor patients need to wait for a long time to meet with the concerned doctor as well as they also need to buy the ticket to stand in a long line .However, the payment system of the hospital is the another suffer for the patient since it’s totally manual.

Now management feels that an information system is very necessary to optimize the operation of the hospital management. Consider that you are the System Analyst of that project and now give the answers given below:

i) What are the deficiencies in above scenario?

ii) What would be your main goals and sub goals to eliminate those deficiencies?

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Cost-Benefit Analysis

- Needed to find economic feasibility of proposed solution
- Objective to find whether returns by implementing a system justify the cost
- Found by listing all costs direct and indirect.
- **Direct Cost-** Cost of computer, software, space, human resource, material,travel, training etc.
- **Indirect Cost-** Time spent by persons and data gathering.
- **Benefits-** Tangible/Physical- measurable

  - Intangible- better management, better user satisfaction

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Benefits

- **Direct -** Savings due to reduced inventory, early collection of outstanding payments, reduced wastage,faster production, increased production
- **Indirect** –Increased work done with same human resource
- **Intangible -** better service to customers

  - superior product quality

  - accurate,reliable,timely and up-to-date strategic,tactical and operational information to management

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Cost – Benefits Analysis

CASE STUDY OF HOSTEL INFORMATION SYSTEM

- **Cost :** PC, UPS, Printer + Systems analyst + programmer
- **Capital**: 70,000 + 60,000 =1,30,000
- **Cost(Recurring)** : Stationery, maintenance, floppy etc. Rs. 2000 per month
- **Benefits :** Inventory reduction 5% of mess bill of 400 students,

  Daily rate=Rs 45
- **Savings** = 45*0.05*30*400=Rs 27,000

  - Transport cost saving=Rs 800 per month

  - Savings due to early payment

  =material cost*1.2%=37.5*400*30*0.012=Rs 5400

  - Savings due to early collection =40*1350*0.01=Rs 540

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Cost – Benefits Analysis(Contd…)

- **Direct Saving** = 33,740/-
- **Indirect Benefit :** student satisfaction due to itemized bill, predictable daily rate,better menu
- Net **Direct Saving per month**= 33,740-2,000

  =31,740/-

✓ Total **Capital Cost** = l,30,000/-

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Pay Back Period

- **SIMPLE:** Cost 1,30,000, Saving 31,740 per month
- Cost recovered in 130000/31740 = 4.1 months
- **Using Interest on Capital:**
- **Monthly Interest**=0.015* 1,30,000

  =Rs 1950 per month
- **Saving per month**=31740-1950=29790
- **Cost recovered** in 130000/29790 = 4.4 months

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Present Value Method

- Accounts for the fact that a benefit accruing **n** months later will be lower today as the money if available today would have earned interest

  If, ***r*** = Interest rate in % per month.

  n = number of months

  x = benefit

- Present value of benefit accruing **n** months later is:

  Present value = $x/(1+r)^n$

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Cost-Benefit

Present Value Method

This account for the fact that benefits each month will also earn interest

Month Value	Cost	Net-Benefit	Present Value of Benefit	Cumulative Benefit
0	1,30,000	0	0	
1		31,740	31271	31271
2		31,740	30809	62080
3		31,740	30354	92434
4		31,740	29905	122339
5		31,740	29463	151802

This also give us less than 5 months as pay back period

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Structure of Executive Summary

- **Feasibility report**
  - What the proposed system will achieve
  - Who will be involved in operating the system
  - Organizational changes to implement system
  - List of benefits of the system
  - Cost of system - Capital +Regular
  - Cost-benefit analysis

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System Proposal Structure

- Introduction with outline of proposal
- Data flow diagram of existing system
- Modified DFD of proposed system
- Discuss alternative solutions
- List new equipment to be installed (if any)
- Technical, operational feasibility of analysis
- Cost- Benefit analysis
- New procedures, human resources and training needed
- Anticipated problems
- Implementation plan